

KLL dielectronic recombination resonant strengths of He-like up to O-like tungsten ions

B. Tu¹, J. Xiao¹, Y. Shen¹, Y. Yang^{1*}, D. Lu¹, T. H. Xu¹, W. X. Li¹, C. Y. Chen¹, Y. Fu¹, B. Wei¹, C. Zheng¹, L. Y. Huang¹, R. Hutton¹, X. Wang¹, K. Yao¹, Y. Zou¹, B. H. Zhang², and Y. J. Tang²

¹Shanghai EBIT Laboratory, Institute of Modern Physics, Fudan University, and the Key Laboratory of Applied Ion Beam Physics, Chinese Ministry of Education, Shanghai 200433, China

²Research Center of Laser Fusion, China Academy of Engineering Physics, P.O. Box 919-986, Mianyang 621900, China

Dielectronic recombination (DR) is an important process in hot plasma physics as well as in atomic structure and collision theory. Here we report the studies of the KLL DR resonance strengths of He-, Li-, Be-, B-, C-, N-, and O-like tungsten ions, through both experiment and calculation. The experimental resonance strengths were determined within uncertainty below 11% at the Shanghai electron beam ion trap by employing a fast electron beam-energy scanning technique. A fully relativistic configuration interaction method implemented in the flexible atomic code was employed to calculate DR process and also radiative recombination (RR). Also the consideration of the interference effect between DR and RR was revealed to be necessary to determine the resonance strength.

The experimental results of the total resonance strengths of He- to O-like tungsten ions agree very well with our calculations obtained by FAC, as in Fig.1. Furthermore, the total resonance strengths of B- and C-like ions agree well with a scaling law in the heavy ion region [1].

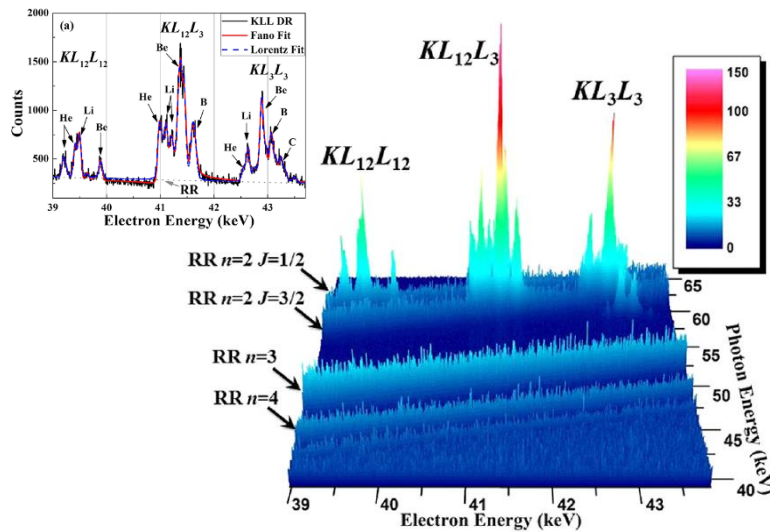


Fig. 1 Three-dimensional spectrum of x-ray intensity, as a function of electron energy for the x-axis and photon energy for the y-axis. The resonance peaks are from KLL DR events of He-up to O-like. More details can be found in [1].

* yangyang@fudan.edu.cn

[1] B. Tu, *et al.*, *Physics of Plasmas* **23**, 053301 (2016)